Trend Study 10R-4-00

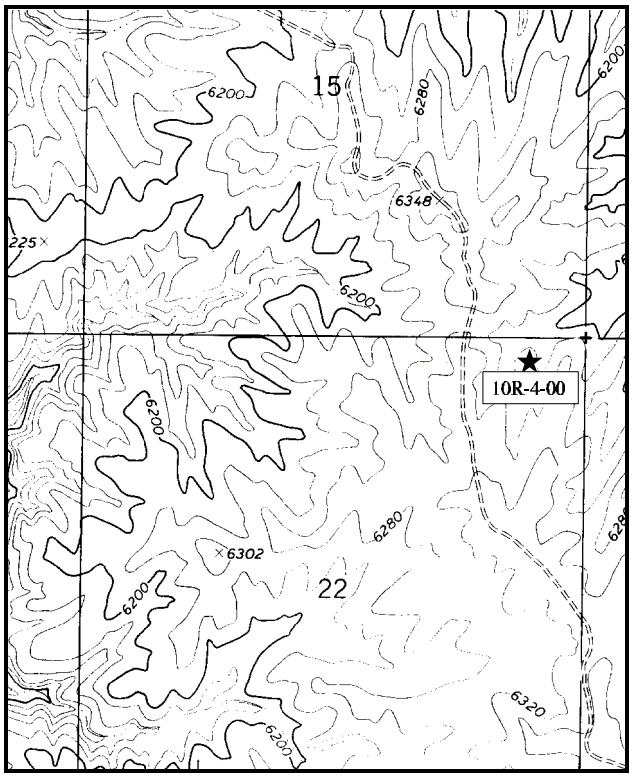
Study site name: Two Water WMA . Range type: Black Sagebrush

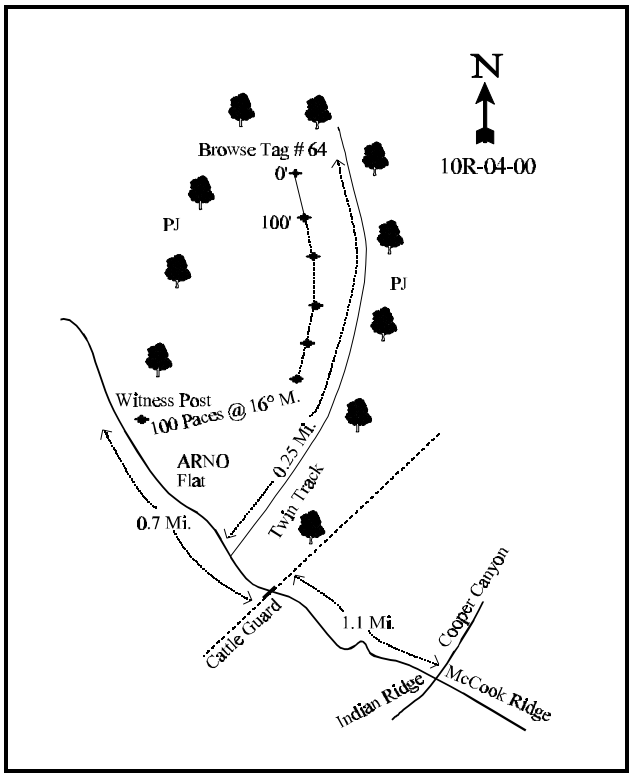
Compass bearing: frequency baseline 162°M . (Line 3 177°M, line 4 180°M, line 5 182°M)

Footmark (first frame placement) 5 feet. Frequency belt placement; line 1 (11ft), line 2 (34ft), line 3 (59ft), line 4 (71ft), line 5 (95ft). Belt 2 rebar at 5ft., belt 5 rebar at 10ft.

LOCATION DESCRIPTION

From the intersection of Cooper Canyon, Indian Ridge and McCook Ridge go northwest on McCook Ridge road. Travel 1.1 miles to a cattle guard. Go 0.7 miles past the cattle guard to a sage brush flat on the right and a witness post. The 500-foot stake is 100 paces into the sagebrush flat at an azimuth of 16°M. It is also possible to reach the site by taking the two track road on the east side of the chaining 0.25 miles to the 0-foot stake. The 0-foot stake is marked with browse tag number 64.





Map name: Cooper Canyon . Diagrammatic Sketch

Township 13 S, Range 23 E, Section 22 UTM 4393244 N, 643846 E

DISCUSSION

Trend Study No. 10R-4

This study is located in a black sagebrush flat in the Two Water Wildlife Management Area. The site is surrounded by pinyon and juniper and located about 1/4 of a mile from a main road. It is on gently sloping (3-5%) terrain with a northerly aspect and elevation of approximately 6,300 feet. Pellet group transect data from 1997 indicated moderately low use on this flat with 13 elk, 33 deer, and 1 cow days use/acre (32 elk, 82 deer and 2 cow days use/ha). Pellet group data from 2000 estimate 5 elk and 60 deer days use/acre (12 edu/ha and 148 ddu/ha). Most of these groups appeared to be from the previous fall and early winter.

The soil is moderately shallow with an effective rooting depth (see methods) of almost 15 inches. It has a clay loam texture with a neutral pH. The soil surface is cracked, indicating shrink-swell potential. Rocks are found throughout the soil profile with over 15% cover for rock and pavement on the surface. Average soil temperature is relatively high at 67˚F at a depth of 14 inches. Phosphorus is low at 3.6 ppm, as values less than 10 ppm may be limiting to normal plant growth and development. Pedestaling was noted around the base of black sagebrush plants with cryptogamic crust found mostly under the sagebrush. Erosion appears minimal due to the level terrain and adequate protective ground cover of vegetation and litter.

The dominant browse on the flat is black sagebrush which provided 85% of the browse cover in 1997 and 87% in 2000. It is a relatively low growing form, averaging only 6 to 8 inches in height. Density is currently (‘00) high at an estimated 21,180 plants/acre. Use was light to moderate in 1997 and mostly moderate in 2000. Seventy-five percent of the population is currently mature with young plants accounting for 14% of the population. Percent decadence increased from 5% to 12%, although vigor is good on most plants.

Winterfat provides some additional preferred forage on the site. It had an estimated density of 4,060 plants/acre in 1997 declining to 2,960 by 2000. The population is mostly mature with light to moderate use. It has a low growth form of only 8 to 10 inches in height perhaps due to continual use. Fringed sagebrush and shadscale are widely scattered on the site. Shadscale currently (‘00) displays moderate use. Other browse species sampled include broom snakeweed and cactus.

The herbaceous understory is limited and dominated by cheatgrass in 1997. It provided 43% of the grass cover and 38% of the total herbaceous cover. That year it had a quadrat frequency of 62%. During the 2000 reading, cheatgrass declined significantly in nested frequency and cover went down from 4% in 1997 to less than a 1/4 of 1%. Quadrat frequency declined from 62% to only 8%. The most common perennial grasses are needle-and-thread and bottlebrush squirreltail. Galleta, blue grama, and Indian ricegrass are also fairly abundant. Thickspike wheatgrass and bluebunch wheatgrass were also sampled, but only occasionally.

Forbs are fairly diverse yet not particularly abundant. Twelve species were sampled in 1997 with only seven species encountered in 2000. They only provided a little over 1% cover during either reading. Most of the forbs were found within the protective cover of black sagebrush canopies. Scarlet globemallow is the most common forb.

1997 APPARENT TREND ASSESSMENT

Erosion on the site does not currently appear to be a problem with the abundant litter and vegetative cover. Percent bare ground cover is moderately high, yet should not be a problem except under extreme conditions. Seedhead formation from last year is abundant on the black sagebrush and percent decadency is low at only 5%. Biotic potential (# of seedlings) for all species is low at this time, likely due to a combination of past drought conditions and moderately shallow soils. Herbaceous understory is very limiting with the dominate species

being cheatgrass. Other perennial grasses are present in low numbers that help add stability to the herbaceous understory community.

2000 TREND ASSESSMENT

Trend for soil is slightly down. Percent bare ground has increased and sum of nested frequency of grasses and forbs have declined by nearly half. Most of this change is due to a significant decline in the nested frequency and cover of cheatgrass. Perennial grass cover and nested frequency remained fairly stable. Trend for browse is up for the key species black sagebrush. Density has increased, use is mostly moderate, vigor good, and young plants account for 14% of the population. The herbaceous trend is stable with respect to perennial grasses and forbs. Needle-and-thread grass and bottlebrush squirreltail remained stable while Indian ricegrass declined significantly. The increase in blue grama and decline in galleta appears to be due to a misidentification of blue grama in 1997. As mentioned earlier, cheatgrass declined dramatically in cover and nested frequency. This was due to the very dry spring and early summer conditions of this season. The most abundant perennial forb, scarlet globemallow, declined slightly in frequency but increased in cover with less competition from cheatgrass.

TREND ASSESSMENT
soil - down slightly (2)
browse - up for the key species, black sagebrush (5)
herbaceous understory - stable for perennials (3)

HERBACEOUS TRENDS --
Herd unit 10R, Study no: 4

Type	Species	Nested Frequency '97	Nested Frequency '00	Quadrat Frequency '97	Quadrat Frequency '00	Average Cover % '97	Average Cover % '00
G	Agropyron dasystachyum	6	2	2	1	.06	.03
G	Agropyron spicatum	13	5	4	3	.36	.30
G	Bouteloua gracilis	-	*25	-	14	-	.31
G	Bromus tectorum (a)	215	*28	62	8	4.02	.11
G	Hilaria jamesii	75	*46	30	17	1.10	.82
G	Oryzopsis hymenoides	64	*34	30	16	.91	.51
G	Sitanion hystrix	84	92	38	39	.87	1.02
G	Stipa comata	92	90	39	38	2.01	2.87
Total for Annual Grasses		215	28	62	8	4.02	0.11
Total for Perennial Grasses		334	294	143	128	5.32	5.89
Total for Grasses		549	322	205	136	9.35	6.01
F	Castilleja spp.	4	-	2	-	.01	-
F	Cryptantha spp.	10	*-	6	-	.13	-
F	Descurainia pinnata (a)	32	*6	15	2	.10	.01
F	Erigeron spp.	3	-	2	-	.03	-
F	Lappula occidentalis (a)	69	*12	30	5	.40	.17

Type	Species	Nested Frequency '97	Nested Frequency '00	Quadrat Frequency '97	Quadrat Frequency '00	Average Cover % '97	Average Cover % '00
F	Lepidium spp.	6	-	2	-	.01	-
F	Machaeranthera grindelioides	-	1	-	1	-	.03
F	Navarretia intertexta (a)	5	-	2	-	.01	-
F	Penstemon spp.	2	-	2	-	.03	-
F	Schoencrambe linifolia	4	2	2	1	.03	.00
F	Sphaeralcea coccinea	100	85	39	33	.57	.82
F	Townsendia incana	-	8	-	3	-	.04
F	Tragopogon dubius	2	2	1	1	.00	.00
F	Unknown forb-annual (a)	9	-	3	-	.01	-
Total for Annual Forbs		115	18	50	7	0.52	0.18
Total for Perennial Forbs		131	98	56	39	0.83	0.90
Total for Forbs		246	116	106	46	1.36	1.08

* Indicates significant difference at % = 0.10

BROWSE TRENDS --
Herd unit 10R, Study no: 4

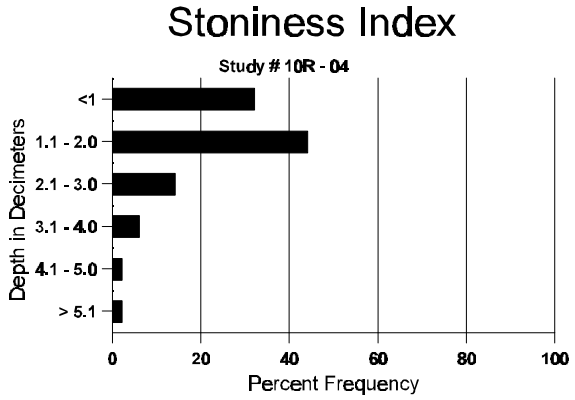
Type	Species	Strip Frequency '97	Strip Frequency '00	Average Cover % '97	Average Cover % '00
B	Artemisia frigida	28	31	.62	1.00
B	Artemisia nova	92	96	19.72	21.10
B	Atriplex confertifolia	34	32	.85	.79
B	Ceratoides lanata	71	57	2.12	1.41
B	Gutierrezia sarothrae	12	3	-	.01
B	Opuntia spp.	2	3	-	-
B	Sclerocactus	1	1	.00	.00
Total for Browse		240	223	23.32	24.31

BASIC COVER --
Herd unit 10R, Study no: 4

Cover Type	Nested Frequency		Average Cover %	
	'97	'00	'97	'00
Vegetation	390	346	28.09	33.27
Rock	296	256	5.72	5.38
Pavement	412	404	13.89	10.66
Litter	483	440	21.39	21.67
Cryptogams	305	262	6.80	7.54
Bare Ground	364	389	23.37	31.45

SOIL ANALYSIS DATA --
Herd Unit 10R, Study no: 04

Effective rooting depth (inches)	Temp °F (depth)	PH	%sand	%silt	%clay	%0M	PPM P	PPM K	dS/m
14.5	67.2 (14.3)	7.25	25.6	37.8	36.6	2.03	3.63	198.4	0.65



PELLET GROUP FREQUENCY --
Herd unit 10R, Study no: 4

Type	Quadrat Frequency	
	'97	'00
Rabbit	8	14
Elk	11	9
Deer	33	32
Cattle	-	1

Pellet Transect			
Pellet Groups per Acre		Days Use per Acre (ha)	
'97	'00	'97	'00
35	191	N/A	N/A
165	61	13 (32)	5 (12)
435	774	33 (82)	60 (148)
9	-	1 (2)	-

BROWSE CHARACTERISTICS --
Herd unit 10R, Study no: 4

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Artemisia frigida																		
S	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	00	-	-	-	1	-	-	-	-	-	1	-	-	-	20			1
Y	97	11	-	-	2	-	-	-	-	-	13	-	-	-	260			13
	00	23	-	-	-	-	-	-	-	-	23	-	-	-	460			23
M	97	76	-	-	1	-	-	-	-	-	77	-	-	-	1540	10	10	77
	00	73	2	-	2	-	-	-	-	-	77	-	-	-	1540	4	7	77

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'97	00%	00%	00%	+10%
'00	02%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
'97	1800	Dec:		-
'00	2000			-

Artemisia nova																		
S	97	19	-	-	2	-	-	-	-	-	21	-	-	-	420			21
	00	13	-	-	-	-	-	-	-	-	13	-	-	-	260			13
Y	97	134	9	-	10	-	-	-	-	-	153	-	-	-	3060			153
	00	111	34	-	-	-	-	-	-	-	138	7	-	-	2900			145
M	97	314	162	-	-	-	-	-	-	-	476	-	-	-	9520	8	17	476
	00	277	431	82	-	-	-	-	-	-	790	-	-	-	15800	6	15	790
D	97	11	13	10	-	-	-	-	-	-	32	-	-	2	680			34
	00	31	70	23	-	-	-	-	-	-	88	-	-	36	2480			124
X	97	-	-	-	-	-	-	-	-	-	-	-	-	-	560			28
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	180			9

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'97	28%	02%	.30%	+37%
'00	51%	10%	03%	

Total Plants/Acre (excluding Dead & Seedlings)				
'97	13260	Dec:		5%
'00	21180			12%

Atriplex confertifolia																		
Y	97	3	-	-	-	-	-	-	-	-	3	-	-	-	60			3
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
M	97	16	7	5	2	-	-	-	-	-	30	-	-	-	600	16	16	30
	00	17	11	-	-	-	-	-	-	-	28	-	-	-	560	14	16	28
D	97	9	-	1	1	-	-	-	-	-	4	-	-	7	220			11
	00	7	7	-	1	-	-	-	-	-	6	-	-	9	300			15
X	97	-	-	-	-	-	-	-	-	-	-	-	-	-	40			2
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	40			2

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'97	16%	14%	16%	- 2%
'00	42%	00%	21%	

Total Plants/Acre (excluding Dead & Seedlings)				
'97	880	Dec:		25%
'00	860			35%

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Ceratoides lanata																		
S	97	3	-	-	-	-	-	-	-	-	3	-	-	-	60			3
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
Y	97	16	2	-	3	-	-	-	-	-	21	-	-	-	420			21
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
M	97	122	42	6	10	-	-	-	-	-	180	-	-	-	3600	10	10	180
	00	80	37	1	3	-	-	-	-	-	121	-	-	-	2420	8	8	121
D	97	2	-	-	-	-	-	-	-	-	1	-	-	1	40			2
	00	1	15	10	1	-	-	-	-	-	11	-	-	16	540			27

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'97	22%	03%	.49%	-27%
'00	35%	07%	11%	

Total Plants/Acre (excluding Dead & Seedlings)				
'97	4060	Dec:		1%
'00	2960			18%

Gutierrezia sarothrae																		
Y	97	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
M	97	13	-	-	-	-	-	-	-	-	13	-	-	-	260	8	6	13
	00	5	-	-	-	-	-	-	-	-	5	-	-	-	100	2	3	5

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'97	00%	00%	00%	-64%
'00	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
'97	280	Dec:		-
'00	100			-

Opuntia spp.																		
M	97	2	-	-	1	-	-	-	-	-	3	-	-	-	60	5	9	3
	00	7	-	-	-	-	-	-	-	-	7	-	-	-	140	2	5	7

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'97	00%	00%	00%	+57%
'00	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
'97	60	Dec:		-
'00	140			-

Sclerocactus																		
Y	97	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
M	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	00	-	-	-	1	-	-	-	-	-	1	-	-	-	20	-	-	1

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'97	00%	00%	00%	+ 0%
'00	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
'97	20	Dec:		-
'00	20			-